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SUPERFUND RECORDS



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
US ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5401



CETHA-IR-A (50-6c)

6 SEP 1989

MEMORANDUM FOR Commander, U.S. Army Engineer Center and Fort Leonard Wood
ATTN: ATZT-DEH, Fort Leonard Wood, MO 65473-5000

SUBJECT: St. Louis Ordnance Plant, Buildings 219A, D and G

1. This memorandum is in response to verbal requests by your staff for information on decontamination and use of warehouse buildings numbered 219A, 219D and 219G. These buildings are located at the Hanley Area of the St. Louis Ordnance Plant (SLOP), St. Louis, Missouri. We understand that they are needed for dry, nontemperature controlled storage.
2. The historical usage of the buildings was determined and the potential contaminants evaluated in 1980 by this Agency. This information is contained in our report "Survey of Hazardous/Chemical Area No. 2 of the Former St. Louis Ordnance Plant", No. 109, dated January 1981. Selected pages from this report, pertaining to these three buildings, are enclosed at enclosure 1. The building interior surfaces are contaminated with low levels of lead, silver, nickel, chromium, cadmium and mercury.
3. Recent efforts by this Agency and your staff to further characterize the condition of these buildings reveal the following. Tests for Extraction Procedure Toxicity - Metals shows that the red colored nonsparking flooring that was installed during the 1940s is not a hazardous waste based on metals content. A separate test for lead content was also conducted. Results of these analyses are provided at enclosure 2. Recent tests conducted by ICF Technology Inc. for this Agency show that the flooring is however, an asbestos containing material (ACM). A sample of the flooring was analyzed by polarized light microscopy with dispersion staining (PLM-DJ), and found to contain 1-5% chrysotile. Inspection of the utility access space and tunnels under the buildings, and testing of pipe insulation, disclosed heating pipes also covered with ACM. This asbestos does not carry into the main floor storage space of the buildings. The ceilings are insulated with a fiberglass type material.
4. As part of the initial assessment of contamination at SLOP, ICF Technology, Inc., the Government's RI/FS contractor, has developed a worst-case assessment of potential risk associated with occasional usage of Bldgs. 219A, D, and G. This assessment is included as part of the work plan for the SLOP RI/FS and pertinent sections are included at enclosure 3.
5. Any work on the three buildings to improve their condition must take into consideration the following contaminants and decontamination requirements. The flooring is an ACM in poor condition due to unprotected exposure to rain, freezing, etc. It must be removed and disposed of in accordance with state and Federal asbestos and related regulations. Work on the heating pipes, especially those in the utility space under the building, must consider the presence of asbestos. If any asbestos is removed while working on the radiators or pipes,

STL007

ATZT-DEH-EE

18 September 1989.

MEMORANDUM FOR Off Post Facilities, ATTN: Ed Rothwell

Subject: Buildings 219A, D, and G at St. Louis Ordnance Plant

1. The US Army Toxic and Hazardous Materials Agency has finished an investigation of the subject buildings at St. Louis Ordnance Plant (enclosed).
2. The report indicates that the contamination in these buildings consists of heavy metal residues on the walls and asbestos in the flooring material. The residue on the walls can be washed off and the flooring materials removed, allowing use of the buildings for virtually any purpose.
3. The wash water from decontamination of the walls would probably be a hazardous waste, requiring special disposal. This water should be caught after this process and disposed of through a licensed hazardous waste Treatment, Storage, and Disposal Facility. Standard asbestos removal procedures should be adequate for the floor.

encl

Scott Murrell
SCOTT MURRELL
Environmental Coordinator

FRANK



14 Dec 89

See me on developing
Specifications.

Rothwell

6 SEP 1989

CETHA-IR-A

SUBJECT: St. Louis Ordnance Plant, Buildings 219A, D and G

it must also be done in accordance with regulations. Respiratory protection and appropriate protective clothing must be used to comply with regulations. The ceiling insulation is fiberglass. Respiratory protection is recommended while removing the ceilings and insulation.


6. The interior glazed tile walls are soiled to touch, and have been shown to possess the contaminants reported in enclosure 1. It is therefore recommended that the walls be completely and thoroughly cleaned with a detergent solution and rinsed with clean water. Protective clothing to prevent skin contact with the contaminants is recommended.

7. After these decontamination procedures, involving ceiling, walls and flooring, are completed, renovation work may proceed using normal procedures and practices. Use of the buildings should be restricted to non-consumables storage.

8. Point of contact at this Agency is Mr. Darryl D. Borrelli, AUTOVON 584-3921 or commercially (301) 671-3921.

FOR THE COMMANDER:

3 encls
as



ROBERT S. METZGER II

LTC, CM

Deputy

Installation Restoration Division

SURVEY OF HAZARDOUS/CHEMICAL AREA NO. 2
OF THE FORMER ST. LOUIS ORDNANCE PLANT

REPORT NO.

VOLUME I

JANUARY 1981

US ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MD 21010

ENCL 1

EXECUTIVE SUMMARY

The Hazardous/Chemical Area No. 2 of the former St. Louis Ordnance Plant was surveyed for explosive and heavy metal contamination. This area was occupied by the Goodfellow US Army Reserve Center (GUSARC) from 1960-1977 for Army Reserve Operations and Training and Hanley Industries, Inc. (Hanley) from 1959-1979 for the manufacturing of explosive and pyrotechnic devices. The Department of Labor (DOL) desired both the GUSARC and the Hanley areas for the site of a Job Corps Center. The DOL had need for the earliest possible use of the GUSARC area, therefore, the USATHAMA survey of Hazardous/Chemical Area No. 2 was conducted in two phases: Phase I was the survey of the GUSARC and Phase II was the survey of the Hanley area.

The findings of the GUSARC area survey (conducted Jan-May 79) revealed the presence of heavy metal residues on the interior surfaces of many buildings as well as the presence of explosive residues in the floor drains of four buildings. This information was transmitted to DOL in Jun 79 to provide guidance for their renovation and demolition activities in the GUSARC area.

The findings of the Hanley area survey (conducted Aug-Nov 80) showed heavy metal residues to be present on the interior surfaces of all buildings and in the aqueous discharge of the sewer system. Additionally, explosive residues

were found on the building interiors of thirteen buildings and in the water sampled in seven powder wells (sumps) draining two buildings.. It is recommended that the 13 buildings and seven powder wells found to contain explosive residues be decontaminated. Additionally, it is recommended that monitoring of the air in the buildings as well as the aqueous discharge of the sewers be conducted subsequent to the renovation and demolition activity proposed to be conducted in the Hanley Area.

Table 2

Hanley Industries

Potential Contaminants

2,4,6-Trinitrotoluene (TNT)
2,4- and 2,6-Dinitrotoluene (DNT)
2,4,6-Trinitrophenylmethylnitramine (Tetryl)
2,4,6-Trinitroresorcinol (Styphnic Acid)
Cyclotetramethylenetetranitramine (HMX)
Pentaerythrite Tetranitrate (PETN)
Lead Styphnate (Lead Salt of Styphnic Acid)
Tetrazene (TEIR)
Nitroglycerine (NG)
Nitrocellulose (NC)
Lead (Pb)
Silver (Ag)
Nickel (Ni)
Mercury (Hg)
Chromium (Cr)
Cadmium (Cd)

Table 3

Hanley Industries

Areas of Potential Contamination

	Building/Magazine	Area
HIGH POTENTIAL	220	All rooms
	218	15 rooms
	218B	12 rooms
	218C	1 room and basement
	219A	All rooms
	219C, E, J, H	Throughout
	219G	Throughout
	227B, L, P, Q	Throughout
	226C, G	Throughout
	229M	Throughout
	Powder wells	Throughout
	Sewer lines	Throughout
MODERATE POTENTIAL	2270, N, M, K, J, H, G, F, E, D, C, A	Throughout
	226H, F, E, D, B, A	Throughout
	229L, N, H, J, K	Throughout
LOW POTENTIAL	227T	
	228 Series	
	Soil	
	Soils	
	Pipe Tunnels	
	Crawl Spaces	

Table 5

Hanley Industries

Explosive Components Loaded for the Military, NASA, and NATO

Delay cartridges
Leads
Detonators
Primers (electric and delay)
Squibs
Explosive Bolts
Activators
Bomb Initiators
Spotting charges
Boosters

Table 6

Hanley Industries

Buildings/Magazines in Which Loading and Mixing of
Explosives were Conducted

<u>Bldg</u>	<u>Room</u>
220	All rooms except basement
218A	102, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 117, 121, 123. <u>Delay powder</u> loaded in basement under Room 105.
218B	110, 113, 115, 119, 123, 125, 127, 128-1, 128-2, 128-3, 128-4, 132
218C	104
219A	Loading of smokeless powder throughout.

Table 7

Hanley Industries

Building Usage

Other Than for Loading and Mixing of Explosives (Table 6)

<u>Bldg</u>	<u>Area</u>	<u>Usage</u>
218A	All rooms not listed on Table 4	Non-explosive storage
218B	Basement	Empty as non-explosive storage
218C	Basement	Burning of explosive contaminated rags
219D		Never used
219G		One time loading of explosives for disposal
219C, B, F, J & H		Drying of explosives
219E		Lead azide reactor
All Other maga- zines		Storage of explosives in sealed containers
219A		Administrative

Table 8
Hanley Industries
Compounds Utilized

Lead Styphnate
Tetryl (2,4,6-Trinitrophenylmethylnitramine)
RDX
NOL 130 (Ignition mix)
Al80 (Ignition mix)
Black Powder
HMX (Cyclotetramethylenetetranitramine)
NOL 60 (Ignition mix)
PETN (Pentaerythrite Tetranitrate)
Tetracene
Silver azide
Smokeless powder
Trinitroresorcinol
Diazodinitrophenol
Delay powder
Lead nitrate
Sodium azide

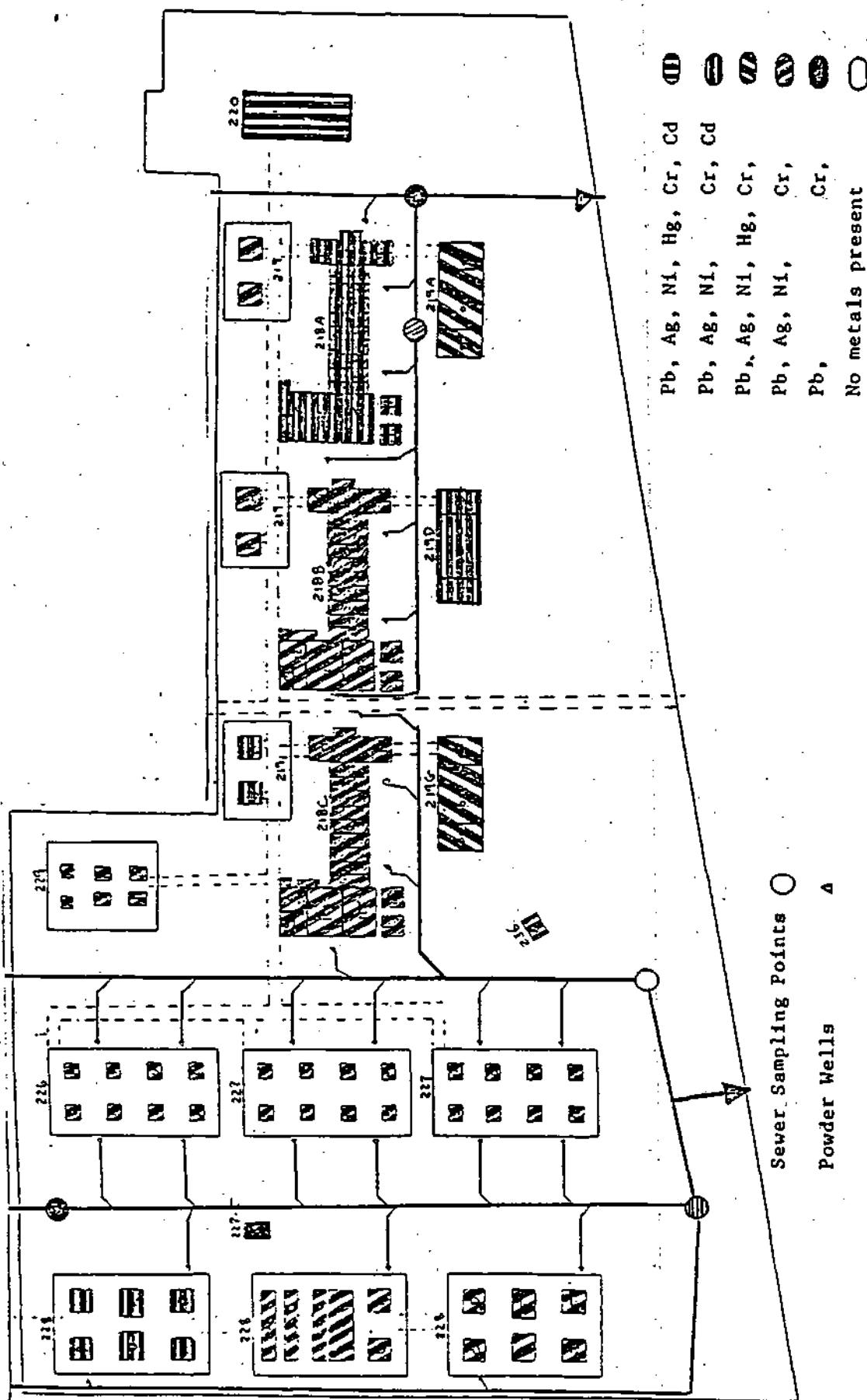


Figure 8. Hanley Area Facilities Contaminated with Heavy Metal Residues

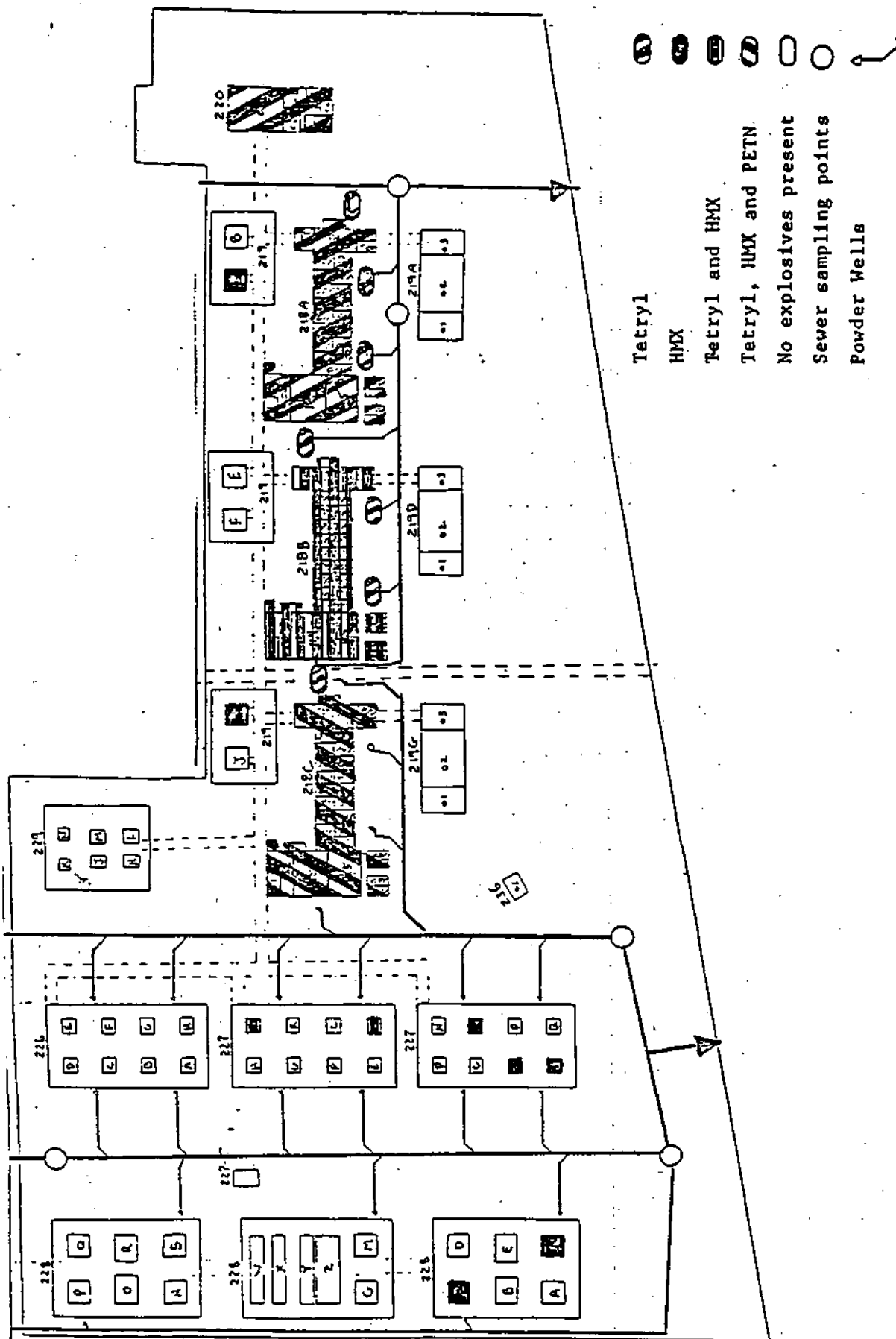


Figure 9. Hanley Area Facilities Contaminated with Explosive Residues

The shaded areas shown on Figure 8 indicate the first floor rooms in which positive results were obtained for tetryl, above the 1 ug/cm^2 level. The composite sample taken in the basement of building 218C showed a positive result for PETN which indicates this explosive is present above the detection limit of 1 ug/cm^2 .

Water samples from the powder wells were composited into nine samples by building or magazine group (maximum of four samples per composite). Explosive compounds were not found in any of the powder well samples above detectable limits of 2.4 ppb. Composite samples from the powder wells which received effluent from buildings 218A and 218B contained 4.0 and 4.6 ppb of tetryl, respectively.

None of the sewer samples contained explosive compounds in concentrations above the detection.

VII. CONCLUSIONS.

A. Goodfellow US Army Reserve Center.

1. Heavy Metal Residues. As tabulated on Table 12 and shown on Fig. 6 heavy metal residues are present on the walls of 27 buildings and magazines. Due to the lack of information concerning building usage the correlation between building usage and survey findings is untenable. It was concluded that the heavy metal residues found in the buildings of the GUSARC posed an ingestion hazard.

2. Explosive Residues. Four magazines were found to contain explosive residues in the floor drains. It was concluded that these residues did not present a safety hazard.

B. The Hanley Area.

1. Heavy Metal Residues. As tabulated on Table 13 and shown on Fig. 8 heavy metal residues were found on all building and magazine interior surfaces

Table 13

Hanley Area

Summary of Findings

<u>Building/Magazine</u>	<u>Findings</u>
220	<u>Records and Interviews:</u> a) Use for administrative space (1941-1945); b) Decontaminated in 1945; c) Explosive laboratory (1959-1979). <u>Survey:</u> Explosive and heavy metal residues present.
218A, B and C	<u>Records and Interviews:</u> a) Primers and tracer mixing (1941-1945); b) Decontaminated in 1945; c) Loading and mixing of explosives (1959-1979). <u>Survey:</u> Explosive and heavy metal residues present in buildings. Explosive residues present in powder wells draining 218A and B.
219A, D and G	<u>Records and Interviews:</u> a) Primer and tracer mixing (1941-1945); b) Decontaminated in 1945; c) Loading of smokeless powder (219A) and administrative space (219D and G) from 1959-1979. <u>Survey:</u> Heavy metal residues present.
236	<u>Records and Interviews:</u> a) Used as a garage 1941-1945; b) 1945-1979 not used. <u>Survey:</u> Heavy metal residues present.
219C and H	<u>Records and Interviews:</u> a) Decontaminated in 1945; b) Open air drying of explosives (1959-1979). <u>Survey:</u> Explosive and heavy metal residues present.
219E	<u>Records and Interviews:</u> a) Decontaminated in 1945; b) Lead azide production (1959-1979). <u>Survey:</u> Heavy metal residues present.
219B, F and J	<u>Records and Interviews:</u> a) Decontaminated in 1945; b) Open air drying of explosives (1959-1979). <u>Survey:</u> Heavy metal residues present.
229 Series	<u>Records and Interviews:</u> a) Decontaminated in 1945; b) Storage of explosive and items (1959-1979). <u>Survey:</u> Heavy metal residues present.
226 Series	<u>Records and Interviews:</u> a) Explosive mixing operations (1941-1945); b) Decontaminated in 1945; c) Storage of explosives in sealed containers (1959-1979). <u>Survey:</u> Heavy metal residues present.

Table 13 (Continued)

<u>Building/Magazine</u>	<u>Findings</u>
227 Series	<p><u>Records and Interviews:</u> a) Explosive mixing operations (1941-1945); b) Decontaminated in 1945; c) Storage of explosives in sealed containers (1959-1979).</p> <p><u>Survey:</u> Heavy metal residues present in all magazines. Explosive residues present in 227A, 227B, 227J, 227M and 227O.</p>
227T	<p><u>Records and Interviews:</u> a) Administrative space (1941-1945); b) Abandoned 1945-1979.</p> <p><u>Survey:</u> Heavy metal residues present.</p>
228 Series	<p><u>Records and Interviews:</u> a) Powder storage (1941-1945); b) Decontaminated in 1945; c) Abandoned from 1945-1979.</p> <p><u>Survey:</u> Heavy metal residues present in all magazines. Explosive residues present in 228C and 228F.</p>